Spitfire

in action

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AIRCRAFT NO. 39

No.317 (Wilenski) Sqdn.
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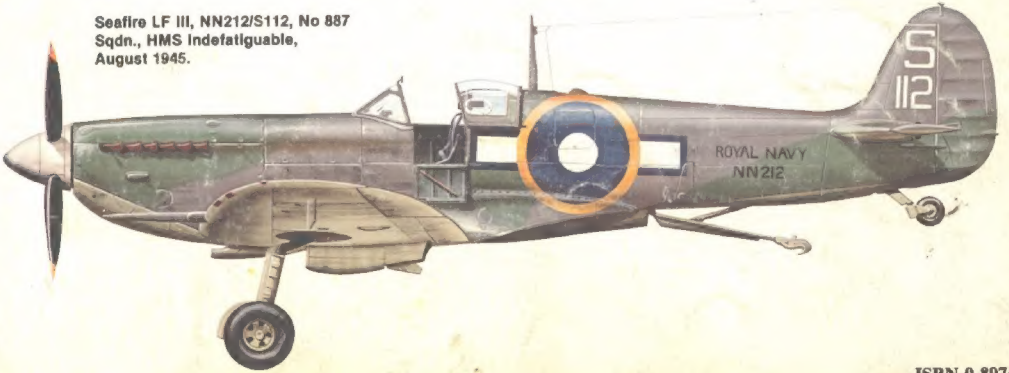
Spitfire Mk Vb, AD140/JH-H, No. 317 (Wilenski) Sqdn., 1941.

Seafire LF III, NN212/S112, No 887 Sqdn., HMS Indefatiguable, August 1945.



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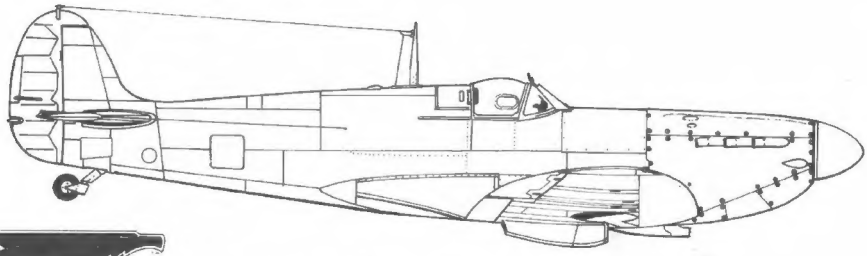
Spitfire in action

by Jerry Scutts

illustrated by Don Greer &
Rob Stern



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Two Spitfire Mk. IXc fighters of No. 312 (Czech) Sqdn. climb out of cloud over the famed Dover cliffs on their way to provide air cover to the troops invading Normandy, 6 June 1944. The distinctive top and bottom D-Day black and white bands were ordered for all Allied aircraft flying over the Normandy area.

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In the summer of 1938, No. 19 Squadron at Duxford became the first Spitfire unit. On 4 May the following year, the Cambridgeshire airfield was opened to the press to record the new fighter for posterity. Points of interest visible here include both flat and bulged cockpit canopies, and flash suppressors fitted to the machine guns on the nearest aircraft, which lacks an individual code letter. Next in line is WZ-C, K9912. (Flight International)

Spitfire Mk I

At the time of its inception there was nothing to match the Supermarine Spitfire for sheer grace of line and, while one might argue its claim to be the most esthetically appealing single seat fighter to emerge from the Second World War, there are surely few contenders for the title. With a combat record second to none, the Spitfire exemplified the part played by the RAF to gain final victory in that conflict, and to the British nation was far more than just another airplane that had helped to win the war. People saw it as the single weapon that had preserved a way of life at a time when everything they held dear was in the greatest danger of being forcibly changed forever. It mattered little to the man in the street that the Spitfire's part in the Battle of Britain was numerically less than that of the Hurricane, for it was the Supermarine fighter that caught the public imagination in a way that was probably unique.

Certainly few fighter aircraft were more aptly named; in squadron service when war broke out, Spitfires were still coming off the production lines when hostilities ceased, a record matched by only a handful of types on either side. But perhaps no greater proof of the Spitfire's longevity is needed than to record tffat even today preserved examples are still meeting stringent RAF airframe X-ray tests necessary for them to fly as part of the Battle of Britain Memorial Flight.

Brainchild of the brilliant designer Reginald J. Mitchell, whose high-performance racing seaplanes laid the foundations for a new generation of military interceptor fighters, the Spitfire stemmed from Air Ministry Specification F.7/30 issued in 1931, for a new fighter to replace the Bristol Bulldog. Supermarine's contender, the heavy, gull-winged Type 224, was one of eight designs submitted to meet the very broad outline of the official requirement. The machine bore little resemblance to either the 'S' series Schneider Trophy racers or the later Type 300 Spitfire prototype, being only a design progression. As it failed to win the design competition and showed little development potential in its original form, Mitchell undertook a further study to be known as the Type 300 - which fortuitously coincided with development of the 1,000 hp Rolls-Royce PV-12 engine, later known as the Merlin. Subsequent specifications issued in 1935 (F.37/34 calling for a four-gun armament and F.10/35, for 6 to 8 guns) found the Type 300, powered by the new R-R engine, a strong contender. For Supermarine, Air Ministry approval of the Type 300 and resultant military contracts meant the difference between public financing and company funding.

By working closely with the engine manufacturers, the Air Ministry and RAE Farnborough, Supermarine eliminated a number of shortcomings in the basic design and began work on a prototype in March 1935, following construction of a wooden mock-up. Twelve months later the prototype, K5054, was transported to Eastleigh airport in Hampshire for its maiden flight with Vickers' chief test pilot 'Mutt' Summers at the controls. On the morning of 5 March the prototype Spitfire was found to fly as well as its graceful lines had indicated.

On 3 July 1936 the initial contract for 310 Spitfires - later increased to 510 - was signed. Mitchell's untimely death on 11 June meant that he never saw the first production Spitfires, but he died confident that the Spitfire was equal to, if not better than, any other fighter in the world. Detail development and production of the Spitfire was covered by Spec F.16/36 and the program proceeded under the guidance of Mitchell's able colleague, Joseph Smith. To Supermarine fell the huge task of organizing the construction of hundreds of complex aircraft at a time when production on such a scale was something quite new to the aircraft industry.

A low wing monoplane of conventional construction, the Spitfire employed an all-metal stressed skin fuselage and single-spar wing with fabric-covered control surfaces. Exceptionally clean cowling lines were achieved by locating the radiator under the starboard wing, with a smaller circular section oil cooler under the port wing to give the characteristic asymmetrical appearance.

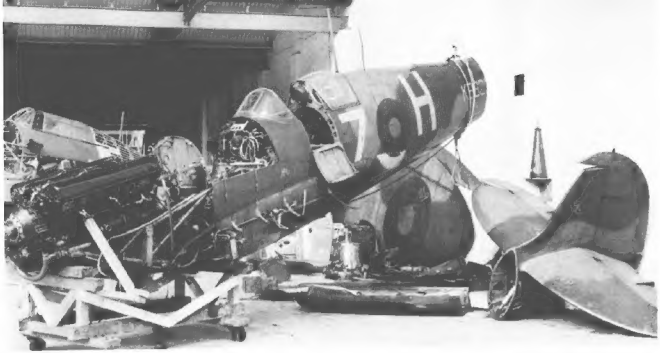
Before and after it had been joined by production Spitfires, K5054 undertook an extensive test program which eventually totalled 151.30 flying hours. It was written off in a crash at Farnborough on 4 September 1939, by which time nearly a dozen RAF squadrons had Spitfires. The first operational unit was No. 19 Squadron, based at Duxford in Cambridgeshire, which accepted its first aircraft in August 1938. Conversion to a high-performance monoplane from biplane Gloster Gauntlets brought No.19's pilots a number of problems, not least of which was remembering to lower the landing gear. As the premier Spitfire unit, No. 19 became the service evaluation squadron for the type and to everyone's credit, there were no fatalities during this demanding but all-important pre-war period.

Throughout the rest of 1938 and into 1939, production and service deliveries proceeded. By 3 September 1939 the RAF had taken 306 Spitfires on charge and 36 had been written off; 187 were distributed among operational squadrons, which were at that time: Nos. 19, 41, 54, 65, 66, 72, 602 and 611, plus 603 and 609 (partially equipped).

RAF squadron reports and manufacturer's development flying led to a number of production line changes to Spitfire Mk Is before the war: the flat cockpit canopy of the early machines was replaced by the familiar curved molding; armor plate protection was added to the rear engine bulkhead; an engine-driven pump replaced hand pump operation of the undercarriage retracting mechanism, and a de Havilland two-speed, 3-blade propeller replaced the original fixed pitch 2-blade unit from the 78th aircraft onwards. Powerplant for the first Mk Is was the 1030 hp R-R Merlin II, which gave way to the Merlin III from the 175th airframe. Of similar power, this engine could take either de Havilland or Rotol propellers, supplies of the latter becoming available in 1939.

The first of the many - K5054 was the prototype Spitfire, completed in March 1936. Here, the aircraft is still unpainted and has the original rudder balance design. Thousands of Spitfires were to be manufactured looking just like the prototype except for minor detail changes. (Vickers)

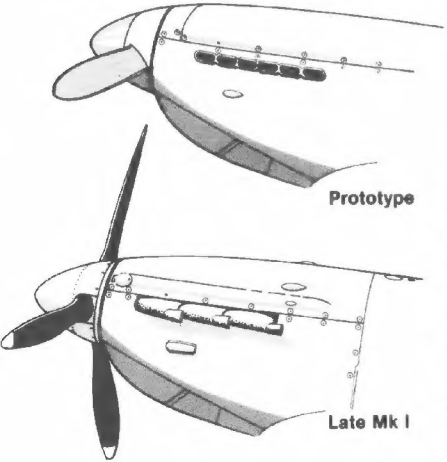
Vickers test pilot Jeffrey Quill taxies the prototype Spitfire out for a press demonstration at Eastleigh, 4 June 1936. (Flight)



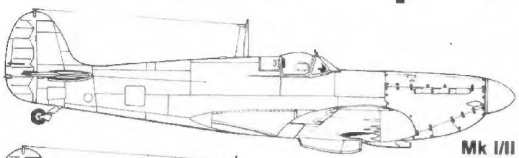
Wrecked but repairable, Mk I K9923, LZ-H of No. 66 Squadron awaits attention, most probably at No. 1 Civilian Repair Unit at Cowley, Oxfordshire. The coding dates the photograph as not earlier than September 1939, when No. 66's code letters were changed from RB to LZ. (Via Bruce Robertson)

The first Auxiliary Air Force squadron to receive Spitfires was No. 602 (City of Glasgow). This view of a 'B' Flight machine shows the half white half black (Night) underside paint scheme introduced in 1939, the early tall radio mast and the flame damping strip on the front fuselage. Under the windshield is the squadron badge, the coat of arms of Glasgow. (Flight)

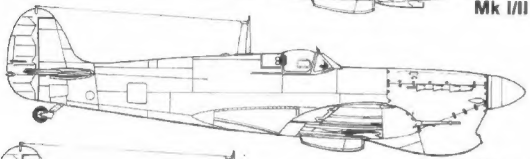
Cowling Development



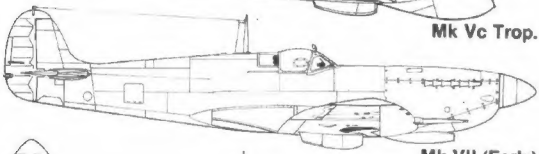
Spitfire Development



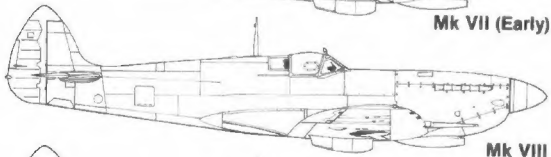
Mk I/II



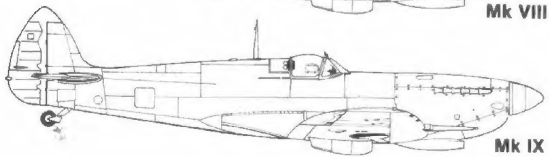
Mk Vc Trop.



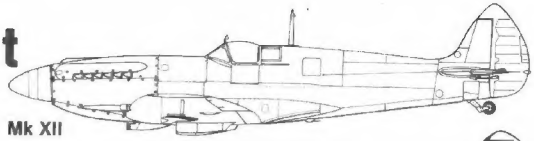
Mk VII (Early)



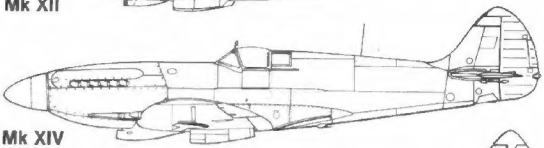
Mk VIII



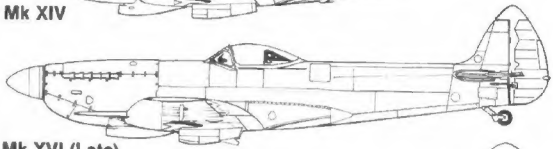
Mk IX



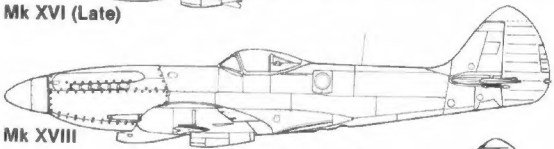
Mk XII



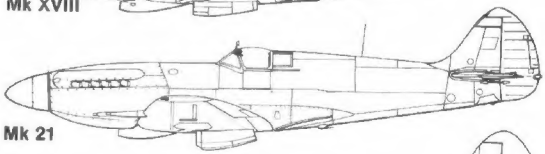
Mk XIV



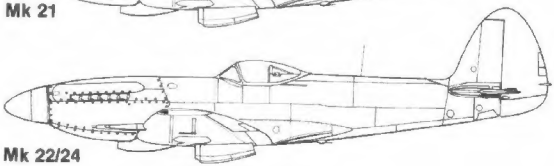
Mk XVI (Late)



Mk XVIII

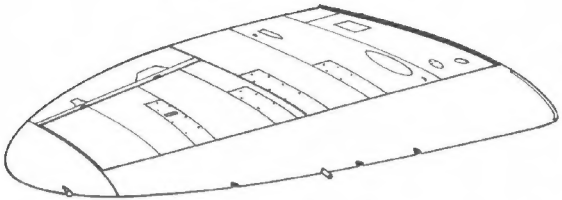


Mk 21



Mk 22/24

'a' Wing



This unidentified Spitfire Mk Ia has been set up for test firing its guns. This was a part of the preservice testing of each new aircraft, and checked the operation of the electrical circuits and the bore-sighting of the guns. (Flight)

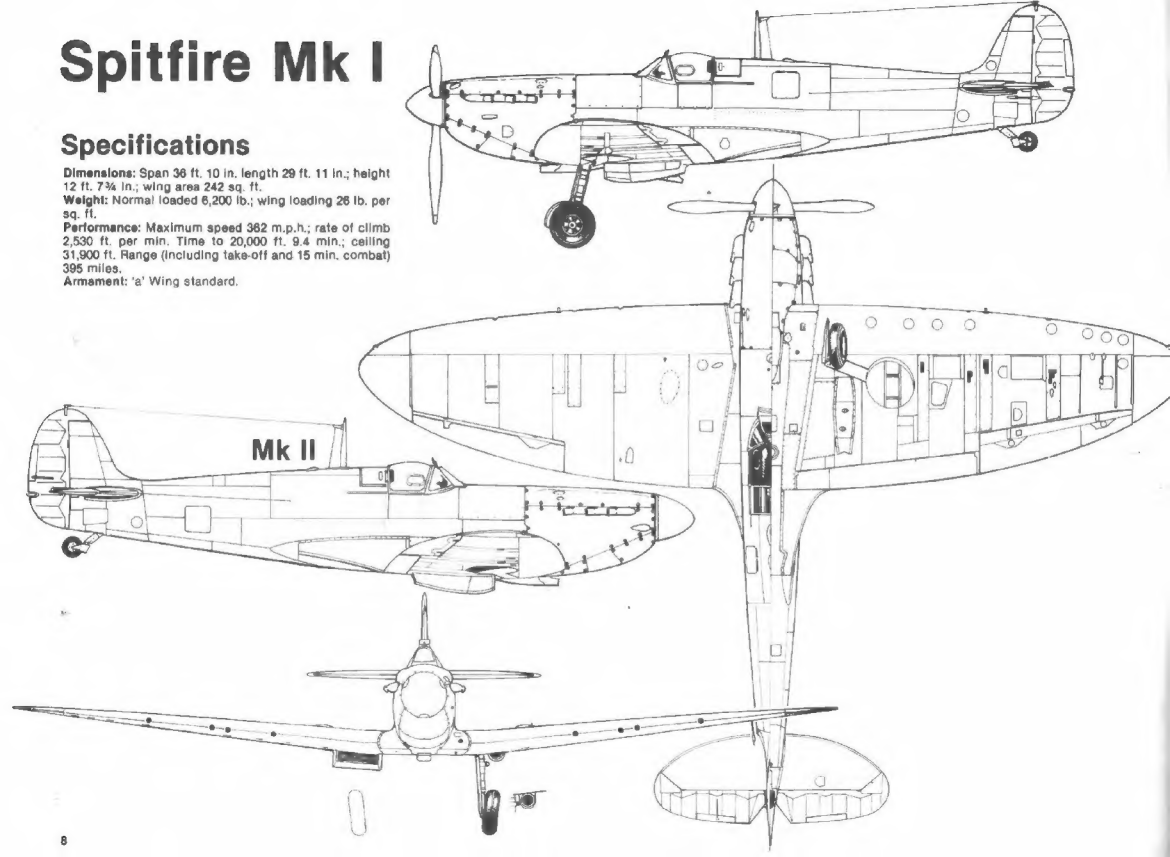
Armorers at work on another No. 602 Spitfire Mk I, this time an aircraft of 'A' Flight. Notice the scuffing of the wing root paint and the yellow gas detector patch. This and the previous photograph were probably taken at the squadron's home station, Abbotsinch, although four other bases were used at various times prior to August 1940. (Flight)

The same airplane during a firing test. The blurred objects below the wing are empty shell casings and belt links. In the air, the smoke seen here would not be apparent. (Flight)

Spitfire Mk I

Specifications

Dimensions: Span 36 ft. 10 in. length 29 ft. 11 in.; height 12 ft. 7¾ in.; wing area 242 sq. ft.
Weight: Normal loaded 6,200 lb.; wing loading 26 lb. per sq. ft.
Performance: Maximum speed 362 m.p.h.; rate of climb 2,530 ft. per min. Time to 20,000 ft. 9.4 min.; ceiling 31,900 ft. Range (including take-off and 15 min. combat) 395 miles.
Armament: 'a' Wing standard.



Spitfire Mk II & III

Incorporating the refinements of the later Mk Is, the Spitfire II was externally identical apart from a small blister fairing over the Coffman starter on the starboard side of the nose aft of the spinner. Powered by the Merlin XII of 1175 hp and using 100 rather than 87 octane fuel, it was built exclusively at a new plant at Castle Bromwich near Birmingham, the first airframe being completed in June 1940. The first 750 Mk IIs had 'a' wing armament, the remaining 170 the 'b' wing. Armor protection for the pilot totalled 73 lbs., the fuel tanks were self-sealing and a bullet-proof windshield was introduced during production, the latter also being retrofitted to Mk Is.

A number of experiments conducted with Mk IIs were aimed at boosting the Spitfire's normal range of 395 miles as, having been designed as a homebased defense fighter with the smallest possible airframe, the aircraft had little room for extra fuel tankage internally. Consequently, various external fuel tank arrangements were tested, including a 40 gal. type faired into the wing leading edge. Nos. 66, 118 and 152 Squadrons used Mk IIs with these tanks for a few operations, although their adverse effect on handling, plus the fact that they were non-jettisonable in combat, caused them to be withdrawn in favor of the fuselage 'slipper' tank.

Mk IIs also became the first Spitfires to carry bombs - albeit of the non-lethal smoke marker variety - when at least 52 examples became Mk IICs, the suffix denoting a different duty from that of Mk IIa/b fighters rather than a change in wing armament. These machines were officially known as 'Sea Rescue Type E (Spitfire)' and carried a small dinghy and food supplies for dropping by parachute. Used by five squadrons, they were redesignated ASR Mk IIs in late 1942.

For its day the Spitfire carried the formidable 'a' wing armament of eight 0.303 in. Browning machine guns, weapons comparable to - and indeed adapted from - American .30 in. guns. But although the number of guns was exceptionally high and each had 300 rounds, the weight of fire was light, rifle-caliber ammunition lacking the destructive power of shell-firing cannon. Consequently in June 1939, some service Spitfires were fitted with two 20mm Hispano cannon. Initial operational use was disappointing, the guns invariably jamming after only a few round had been fired. The problem was eventually traced to faulty feed mechanisms, and henceforth cannon became an integral part of British fighter aircraft armament.

Fitting the cannon necessitated some redesign of the Spitfire wing, each drum-type magazine requiring a raised 'blister' over its bay; with the addition of four machine guns, this wing took the suffix 'b' and in common with other armament layouts, was added to the mark number to denote each such change.

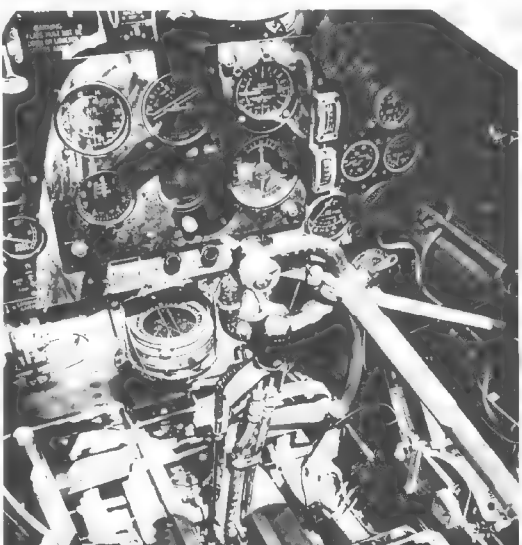
Spitfires were blooded in action for the first time over Scotland on 16 October 1939, when Nos. 602 and 603 Squadrons, Auxiliary Air Force, scrambled sections from Grangemouth and Turnhouse respectively to intercept Ju 88s attacking shipping in the Firth of Forth. A confused melee resulted in the destruction of one enemy aircraft, the victim of Sqdn. Ldr. E.E. Stevens, leading Red Section, 603 Squadron.

Further actions took place as the Luftwaffe probed Britain's defenses prior to the proposed German invasion and by the spring of 1940, a further eight squadrons had received Spitfire: Nos. 64, 92, 152, 222, 234, 266, 610 and 616. On the morning of 1 July there were eight Spitfire squadrons with 128 aircraft based in south-east England as part of 11 Group, Fighter Command, with six in 10 Group (92 aircraft) charged mainly with defense of the west country, and five in 12 Group (72 aircraft) in the northeastern part of the country.

That the Spitfires, backed up by 456 Hurricanes, were enough to destroy the myth of Luftwaffe invincibility and so forge the first turning point of the war, is part of history. The series of engagements that constituted the Battle of Britain highlighted technical and tactical weakness on both sides. More evenly matched than they had ever been, the Messerschmitt pilots were occasionally able to exploit one drawback with the early Spitfires - the tendency for the engine to cut out as a result of carburetor flooding under negative Gs, particularly when the stick was pushed hard forward. An expedient solution in combat was a half-roll and dive in order to keep the engine running. Later, diaphragm carburetors cured the problem completely but a temporary measure was the insertion of a restricter orifice which prevented fuel from being flung to the top of the carburetor and momentarily starving the engine.

Although it was represented by but a single example, N3297, the Mk III was important as the first significant redesign of the Spitfire. It differed from previous marks by having clipped wings, a strengthened fuselage with a retractable tailwheel, an internal bullet-proof windshield and 88 lbs. of armor plating. Two inches more forward rake was added to the strengthened undercarriage and the wheels were enclosed by doors when retracted. Used as a test bed, N3297 subsequently flew with different armament and radiator designs, and engines in the Merlin 60 and 61 series.

The Spitfire cockpit, showing the distinctive 'spade handle' control column grip with gun firing thumb button on the left. Stout locks are holding the 'stick' rigid in this view. (Via Bruce Robertson)



Adorned with appropriate initials and rank pennant below the windscreen, Mk II P7966 was the mount of Wing Commander Douglas Bader in the summer of 1941 when he led the Tangmere Wing. (P. Allonby)

Pictured at Tangmere early in 1941, Mk IIa P7753 was the usual aircraft of Flt. Lt. L. H. Casson. On charge to No. 616 Sqdn (despite the 'QJ' code of No. 92 Sqdn), the machine appears to have a dark outline to its fuselage roundel due to the use of orthochromatic film. (P. Allonby)

Spitfire Mk V

With the end of the daylight phase of the Battle of Britain, Fighter Command rested those squadrons that had borne the brunt of the fighting and prepared for an extended and equally grueling campaign of offensive operations across the Channel, which was to last until June 1944. Progressively equipped with Spitfires as the Hurricane was phased out, the day fighter squadrons maintained pressure on numerous targets in the occupied countries, within a broad framework of operations, the most important of which were given code names: **Rhubarb** - small scale attacks by fighters or fighter bombers; **Circus** -heavy escort to light bombers acting as bait to bring enemy fighters to battle; **Ramrod** -similar to a Circus but with the primary object of destroying the bombers' target; **Roadstead** - an attack by bombers under fighter escort on shipping targets; **Rodeo** - a straight forward fighter sweep over enemy territory; and **Ranger** - a freelance penetration of enemy airspace in squadron or wing strength aimed at wearing down the defenses.

Such operations were costly in both men and machines and although (until the advent of the Fw 190 in the autumn of 1941) Spitfire squadrons were able to hold their own against the Bf 109E and F, German fighters were only one of the hazards to be faced. Many Spitfires fell not in aerial combat but to ground fire of all calibers, ranging from rifle rounds to purpose-built flak guns. The victims, including experienced pilots such as Bob Stanford-Tuck and 'Paddy' Finucane, were sorely missed.

At the beginning of 1941, with the Spitfire equipping most operational fighter squadrons, every effort was made behind the scenes to ensure that it remained at least equal to its Luftwaffe adversaries. Nonetheless, it was obviously undesirable to disrupt production by introducing any radical design changes. Thus, in February, No. 92 Squadron was the first to receive examples of the interim Mk V, followed by No. 91 in March. These machines were part of the initial order for 1000 Mk Vs.

Externally similar to preceeding variants, the Mk V was a Mk I/II airframe with longerons strengthened to take a Merlin 45 powerplant combat-rated at 1470 hp. By June 1941, production of the Mk Va with machine gun armament was terminated in favor of the Vb, which had a mixed armament of 20mm cannon and 0.303 in. MGs.

Early Vb aircraft had the full span wings of the Mks I and II, although to improve low altitude performance, clipped wings of 30 ft. 6 in. span were introduced later. Numerous detail improvement were made to the Mk V throughout its production life at both manufacturer and service levels, the most significant for the former being a jettisonable cockpit canopy with more bulbous contours, replacement of metal-covered ailerons and the fitting of 'fishtail' flame-damping exhaust stubs.

By September 1941, 27 RAF squadrons were flying the Mk Vb and a few the Va; by December this figure had risen to 46 plus the first two American 'Eagle' squadrons. Output had passed the 1700 mark by early 1942 and the first Westland-built machine flew in January to push the total for the year to more than 3300. By June 1942, there were 59 UK-based fighter squadrons with Mk Vs, plus seven in the Mediterranean, two months later no fewer than 42 Spitfire Mk V units were available to cover the landings at Dieppe.

As the most numerous of all Spitfire variants, the Mk V was eventually to equip more than 100 RAF squadrons, be sold to nine foreign governments and fly operationally in the hands of nationals of over a dozen countries; it was engaged on every battle front where RAF or Allied air forces were committed.

As the threat of an invasion of England receded, the first of those far-flung battle fronts was the Mediterranean where, by the spring of 1942, defense of the island of Malta was becoming critical. Only Spitfires could meet the German fighters on equal terms, and in consequence the first tropicalized Mk Vs were dispatched to Malta by aircraft carrier.

With a large and unmistakeable under-nose fairing over the Vokes Multi-Vee filter for the carburetor air intake, the Mk Vc also had enlarged oil and radiator intakes for more effective cooling in tropical and desert climates. To improve range, three sizes of fuselage slipper tanks - 30 gal. for short range, 90 gal. for long range and 170 gal. for ferrying - could be fitted to belly attachment lugs.

The Mk V was built to take various engines, including the Merlin 45 (F Mk Va); 45 or 46 (F Mk Vb); 45, 46, 50, 50A, 55 or 56 (F Mk Vc) and Merlin 45M, 50M or 55M (LF Mk Vb). The 'c' suffix denoted a new wing fitted with either four cannon or two cannon plus four MGs or eight MGs. The landing gear had two inches more forward rake on strengthened units, as tested on the Mk III. A number of the Mk Vc aircraft sent to Malta had four cannon wings, although the second pair of guns was invariably removed due to a shortage of ammunition on the island, and because two cannon were not only found to be adequate in combat but also enabled the aircraft to climb faster. Four-cannon Mk Vs were subsequently used in action.

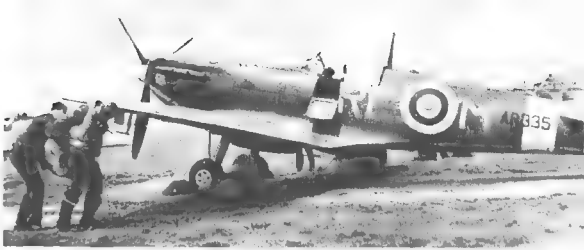
While the great majority of Mk Vs intended for overseas use were fitted with the Vokes filter fairing, a smaller, more streamlined fitting was developed by No. 103 Maintenance Unit at Aboukir, Egypt. Five machines modified by this same unit formed the 'Special Performance Flight' for the interception of very high altitude Ju 86 reconnaissance aircraft, the Mk Ve with clipped wings successfully catching enemy aircraft at heights of 40,000 ft. One example was later fitted with a Merlin 61 with a four-bladed propeller and multiple exhaust stacks, although it was by no means the only Mk V so modified in a theatre that saw much expedient interchanging of parts during repairs and overhauls.

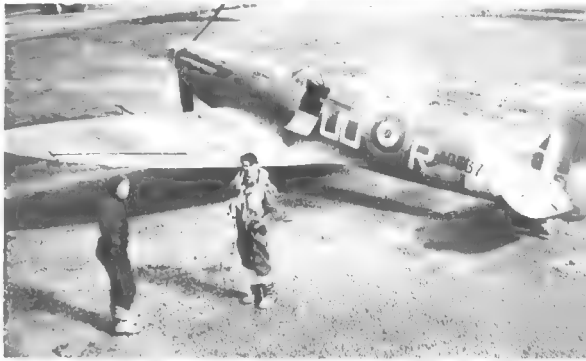
The Spitfire was widely used as a fighter-bomber in the Mediterranean, Mk Vs carrying two 250 lbs. bombs on wing racks and up to 500 lbs. on a fuselage centerline carrier. Engines more suited to low level operations, such as the Merlin 45M, 50M or 55M, were fitted, these powerplants having negative G carburetors and fuel de-aerators. In the LF Mk V, these and other modifications gave an increased climb rate of 7000 ft. per minute and 9 mph more speed at heights below 4-5,000 ft.

In flight during the summer of 1941, R6923/QJ-S of No. 92 Sqdn is seen with the CO, Squadron Leader Jimmy Rankin, at the controls. One of the original cannon-armed Spitfire Ia issued to No. 19 Sqdn during 1940, R6923 was brought up to Mk V standard and issued to No. 92 early in 1941. The 'East India Squadron' title appears forward of the windshield, with 'Sheila' painted diagonally below it. Some retouching of the dark green camouflage color is evident. (Imperial War Museum)

Probably photographed during the autumn of 1941 at Gravesend in Kent, these Mk Vb Spitfires are from No. 72 Sqdn, which then formed part of the Biggin Hill Wing. The unit used Gravesend - Biggin Hill's satellite field - during July and was based there again from September 1941 to March 1942. (Via Robertson)

(Above right) Second of the Polish fighter squadrons to be formed in the UK, No. 303 drew its personnel from Nos. 111 'Kosciuszko' and 112 'Warsaw' Fighter Squadrons, Polish Air Force. Here, a pilot prepares for a sortie in Mk Vb AR335, typically marked with both the Polish flash and Kosciuszko squadron badge. (Gen. Sikorsky Historical Institute)

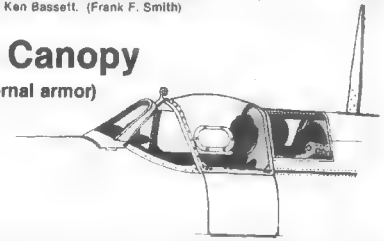




The first Australian fighter squadron to form in the UK was No. 452, in April 1941. Moving to Redhill in October, its aircraft included AD537/UD-R, pictured here with LAC D. Keeble and Sgt. Ken Bassett. (Frank F. Smith)

Mk V Canopy

(external armor)



The second RAAF Squadron was No. 457. It received the Spitfire Mk Vb in March 1942 and also moved to Redhill, in May. Identifiable only by its last two serial digits, '05', this aircraft makes a dispersal point study that was repeated thousands of times all over the world during the war. (F.F. Smith)

Good detail view of a Mk Vb at the moment of 'Chocks away'. (Vickers)

Among the many pilots lost during low-level fighter sweeps over France was the famous ace Robert Stanford-Tuck, brought down by groundfire. This view of Tuck's Mk Vb shows his kill tally and the wood Jablo propeller, which has shattered on impact. This aircraft was later retrieved for salvage. (Bundesarchiv)

(Below Left) Ignominiously dumped, these three Spitfires were early examples of the vast numbers of Allied aircraft to fall on continental Europe during the war years. In the foreground is a Mk Vb of No. 234 Sqdn, then another Vb of No. 306, (possibly AB364/UZ-A) and finally the Mk V flown by Robert Stanford-Tuck, coded 'RS-T' and displaying his tally of 29 kills on the fuel tank cover. (Bundesarchiv)

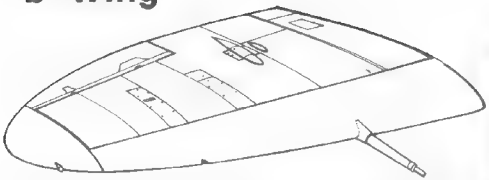
Down on a French beach, Mk Vb AA837, late of No. 501 (County of Gloucester) Squadron has a line attached to its tailwheel leg in preparation for dragging away, although subsequent pictures of the incident show that this was not accomplished before the tide came in! (Bundesarchiv)

Having its radio serviced and fuel tanks replenished, this Mk Vb is seen while on strength with the 308th FS, 31st FG during operations from the UK between June and October 1942; code letters HL-U. (Aeroplane Monthly)

(Above Left) If the April 1943 dating of this photo is correct, then not only an engine is about to be changed, but also the Spitfire. April was the month that the 336th FS went operational on P-47s, the last 4th FG squadron to do so, at Debden, Essex. The 'MD' codes seen on this Spitfire Vb would also change, to 'VF' on the P-47 Thunderbolts. (USAF)

Some of the 143 Mk Vbs delivered to the Russians await collection by their new owners from a depot in the Persian Gulf, probably Abadan. Marked with black-outlined red stars, the group of aircraft seen here includes EP495. (IWM)

'b' Wing



New film goes into the wing root gun camera of a Mk Vb of No. 303 Squadron in a sand-bagged dispersal at Northolt. The machine's Polish pilot has at least seven victories chalked up. (Gen. Sikorsky Historical Institute)

An echelon formation of Mk Vbs from No. 81 Squadron seen in the summer of 1942, when it was part of the Hornchurch Wing. Most aircraft have serials in the 'BM' range, FL-J being BM378 and right at the rear, BM461 is 'A'. (IWM)

A striking air-to-air view of a Mk Vb, EN821/SN-M of No. 243 Sqdn, a unit reformed in the UK after flying Brewster Buffaloes against the Japanese. Remaining in Britain for about three months before transferring to Algeria in December 1942, No. 243 flew Spitfires until disbanding in Italy in October 1944.

(Below Left) No. 340 Sqdn, the first Free French fighter unit formed in the RAF, taxies out for take off in its Mk Vbs. (ECPA)

A Polish pilot leaps from his Spitfire after an obviously successful sortie. The squadron is No. 302, the aircraft Mk Vb W3902/WX-T. (Gen. Sikorsky Historical Institute)

The third RAAF Spitfire squadron in the Pacific area, No. 79 was formed in July 1943 and participated in an island-hopping campaign that began on Goodenough Island and ended in Borneo. En route it used Horn Island, one of the group of Thursday Islands off Australia's Cape York Peninsula, where Mk Vc JG807/UP-P is seen landing in 1943. (F.F. Smith)

Formed in Australia, No. 451 Sqdn operated in North Africa and Italy until the end of 1944. August 1943 saw the unit at El Daba, where these five Mk Vc fighters were photographed. In the foreground is LZ943, with EF655/A next in line; clearly visible on the nearest machine is the tailplane-to-fuselage aerial for IFF equipment. (F.F. Smith)

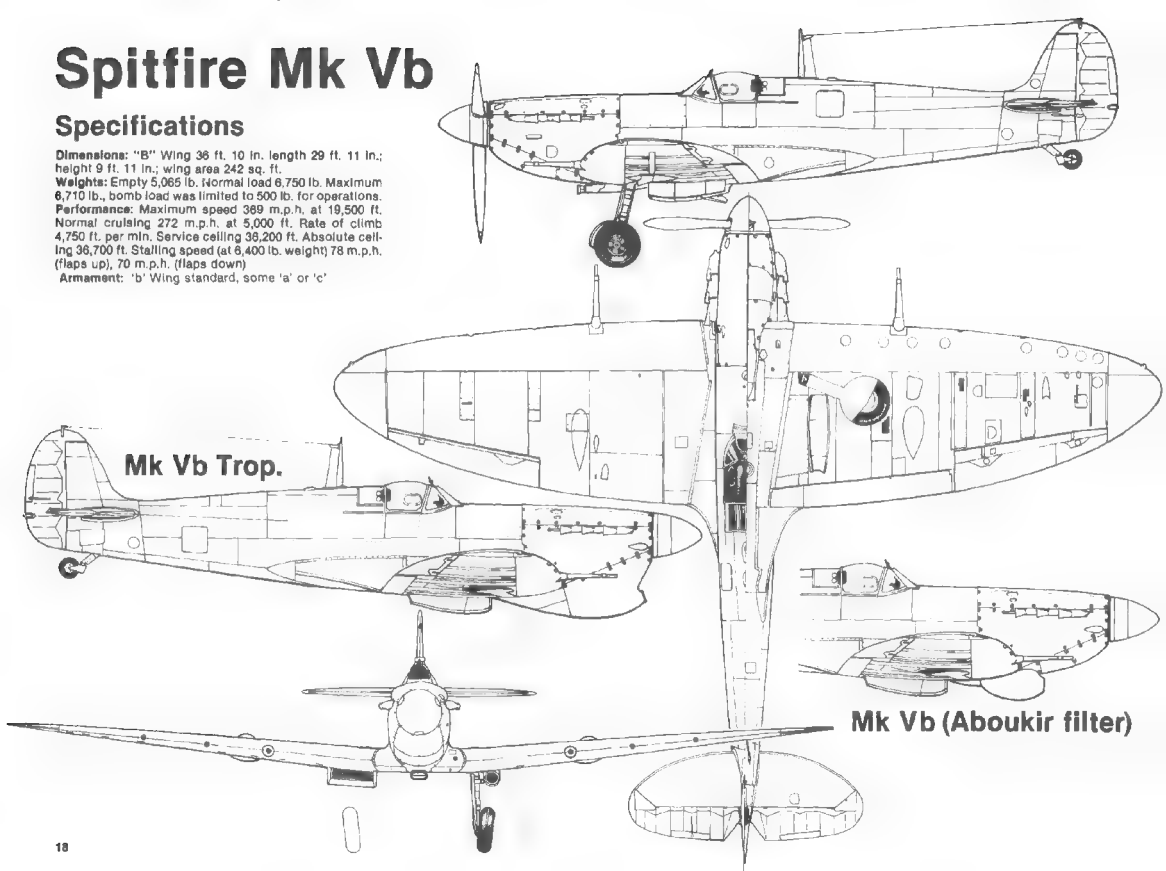
Spitfire Mk Vb ER810 shows the major recognition points of the tropicalized Spitfires intended for service in the Mediterranean. The most noticeable is the deep chin fairing for the Vokes tropical air filter. Although causing some drop in speed, this filter enabled engines to run far longer in dusty conditions before being replaced. Note the piping going from the rear exhaust stack into the cowling. This delivered hot air for heating the guns at high altitudes. (Vickers)

A Spitfire Vb of No. 310 (Czech) Sqdn. This represents the typical mid-war appearance of the Spitfire with Type 'C' roundels, Light Grey codes, Sky fuselage band and spinner and the new Ocean Grey, Dark Green and Medium Sea Grey camouflage. (Dusan Mikolas)

Spitfire Mk Vb

Specifications

Dimensions: "B" Wing 36 ft. 10 in. length 29 ft. 11 in.; height 9 ft. 11 in.; wing area 242 sq. ft.
Weights: Empty 5,065 lb. Normal load 6,750 lb. Maximum 6,710 lb., bomb load was limited to 500 lb. for operations.
Performance: Maximum speed 369 m.p.h. at 19,500 ft. Normal cruising 272 m.p.h. at 5,000 ft. Rate of climb 4,750 ft. per min. Service ceiling 36,200 ft. Absolute ceiling 36,700 ft. Stalling speed (at 6,400 lb. weight) 78 m.p.h. (flaps up), 70 m.p.h. (flaps down)
Armament: 'b' Wing standard, some 'a' or 'c'

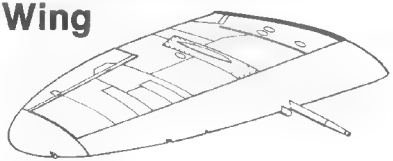


Still bearing the US flag marking applied for the North African landings, this Spitfire Vc is seen at a repair depot after being shot down in central Tunisia early in 1943. A machine of the 5th FS, 52nd FG. (USAF)

(Above Left) In Dec. 1942, Brig. Gen. Jimmy Doolittle visited Tafaraoui, Algeria, home of the 31st FG, and borrowed a Spitfire Vc of the 308th Squadron for a short flight. This starboard side view of the machine he used (coded HL-M) shows the 'Lobo' marking which appeared only on this side, and the black shadows to the code letters. (USAF)

Some Mediterranean maintenance units handled Spitfires in almost production line quantities, although the resulting machines were often far from new.(ECPA)

'c' Wing



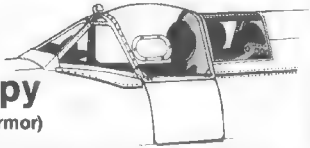
Over the Adriatic en route to a target in Italy, this heavily armed Mk Vc fighter bomber of No. 2 Squadron SAAF is fitted with four wing cannon and carries a 500 lb. bomb on the centerline rack. Sporting No. 2's 'Flying Cheetah' emblem on the rudder, this machine has had its serial digits overpainted, leaving only the prefix letters 'JK'. (Imperial War Museum)

Interesting view of Mk Vs at a Mediterranean depot, probably Blida, on being transferred to French Air Force control. The machine being towed appears to have PRU type roundels and fin flash with white rear fuselage band and spinner, an unusual combination on this camouflage finish. (ECPA)

(Above Right) Spitfire Vc LZ820 of the 4th FS, 52nd FG crash-landed at Borgotaro, Italy on 19 December 1943, apparently after running out of fuel in the company of two other Spitfires which also put down there. Fitted with a Merlin 61 with multiple exhaust manifolds and three-blade propeller the aircraft bears the name 'Pauline' on the nose and 'Capt. Kelly' forward of the insignia. The machine almost certainly retains the Vokes filter fairing under the nose. (P. Guerra via Interinfo)

This Mediterranean airfield shows a Mk Vc in USAAF service, bearing non-standard codes. This Spitfire was flown by Fred Murray Dean, the Commanding Officer of 31 FG, and bears his initials: FMD. This is one of the few U.S. aircraft to show the adoption of the British practice of a CO using his initials on his aircraft in place of squadron or group codes. (USAF Museum via R. Warren)

Mk V Canopy
(Internal armor)



Languishing in a dump after the war, this Turkish Air Force Mk Vc has a Mk IX-type pointed rudder, probably taken from one of the latter variants supplied after the end of WWII. Previously Spitfire Vs had carried the star and crescent insignia on the rudder. (Turkish Air Force)

Early Photo Reconnaissance Spitfires

Development of the early photographic reconnaissance Spitfires was not directly related to that of the fighter variants, but is included here to retain the chronological sequence. Broadly speaking, there were four marks (A-D) of PR Spitfires before the Mk V, although their designations referred to equipment changes on the same airframe. They were identified as follows: **PR Type A** - two Mk IIs fitted with wing cameras; **Type B** -retrospective designations of the Type A machines fitted with a 29 gal. internal fuel tank; **Type C** (Also known as the PR Mk I and III) - initially these were the same Mk IIs, converted to take the rear fuselage fuel tank and wing and fuselage cameras, but this designation also applied to other conversions from Mks I and V airframes, one of which had the 'D' wing with internal fuel to boost range to 2000 miles.

Several modifications were made to the **Type** ■ (PR Mk III) - the wings had 86.5 gal. fuel tanks on each side and two F.8 and F.24 cameras were mounted in the fuselage in tandem to give overlapping photographs, wing cameras and the extra fuselage fuel tank being dispensed with. Total fuel carried was 218 gals. Cockpit heating was improved, the oxygen supply was increased and additional oil was housed in a 14 gal. port wing tank. Two aircraft were built to Type D standard, the powerplant in both cases being the Merlin III.

Apart from the installation of ■ Merlin 45, the Spitfire PR Mk IV was identical to the two Type D PR Mk IIIs. Standardization of camera fittings was as follows: 'W fitting' - two F.8 cameras with 20 in. focal length lens, 'S fitting' - two F.24 cameras with 14 in. lens, and 'Y fitting' - two F.52 cameras with 36 in. lens.

The 229 PR IVs were all offset from Mk Va/b orders. No armament was fitted, wing leading edges housing 66.5 gal. fuel tanks to give a total of 218 gallons. Other standard equipment included a 'K' type dinghy, 1.5 gals. of drinking water and TR 1133 r/t set. The PR Mk IV was fitted with the Aboukir filter, and saw widespread service.

The designation PR Mk V was initially applied to 15 Mk V conversions fitted with the Merlin 45 and Type C camera installation. It was subsequently changed to PR Mk IV to avoid confusion with standard Mk V fighters.

The Spitfire PR Mk VII (also referred to as the type G) was the first armed PR Spitfire. Fitted with two F.24 vertical cameras in the rear fuselage and the 29 gal. fuel tank below the seat, the PR Mk VII featured a bulletproof shield, reflector gunsight, armor, and teardrop blisters in the cockpit canopy. 45 PR Mk VIIs were produced by Heston in 1941-42, converted from standard Mk.I fighters.

Above and below: A PR Mk IV, BP904 of No. 2 Photographic Reconnaissance Unit, in North Africa in 1943. Note the frameless windshield and 'tear drop' bulged canopy sides to give the pilot maximum possible vision. (F.F. Smith)

PR Tear Drop Hood

Spitfire HF Mk VI

Based on the Mk V airframe, the HF Mk VI was the first Spitfire specifically intended for high altitude combat, rather than reconnaissance duties. Fitted with a pressurized cockpit and powered by a Merlin 47 of 1415 hp, it had increased span 'c' wings of 40 ft. 2 in. Although intended for use in England, No. 124 Sqdn receiving its first example in February 1941, five were shipped to the Middle East to replace the Special Performance Flight Mk Vs.

In the event, the Mk VI's performance fell short of expectations and only 97 were completed; it did not prove as good as the modified SPF Mk Vs overseas, being unable to reach Ju 86P-2 flights then operating at 50,000 ft. The most serious drawback was the fact that the canopy had to be locked down to allow pressurization and was not intended to be opened in flight, although it could be jettisoned in an emergency.

Relegated to second-line and training duties, the majority of Mk VIs had their pointed wingtips replaced by standard tips and armament removed.

The first special high-altitude version of the Spitfire, the HF Mk VI served with eight squadrons, No. 124 being one of the first. Seen at Debden in July 1942 is BR579/ON-H, with extended wingtips and the cabin pressure air intake below the exhausts. (IWM)

Spitfire Mk VII

Development of the Merlin-engined Spitfires reached a peak in the Mks VII and VIII, both of which incorporated considerable design changes. The pressurized Mk VII was the first variant to have rectangular radiator air intakes of similar section on each wing underside rather than a circular section oil cooler that had given the Spitfire its distinct asymmetrical appearance from head-on. This change was the result of a redesigned engine cooling system for the Merlin 61, 64 or 71 with multi-ejector exhaust manifolds. Both air scoops contained radiators, that on the starboard side being for the supercharger intercooler, that on the port for the oil cooler.

To accommodate longer engine mounts, the fuselage of the Mk VII was stretched to 31 ft. 3.5 in. with the early rounded rudder, 31 ft. 6 in. with the broad chord rudder. A retractable tailwheel was also fitted. Pressurization was a later version of the system fitted to the HF Mk VI, with a similar location but now the advantage of a sliding cockpit canopy. Extended tips were fitted to the 'c' type wings, which had reduced span ailerons and two leading edge 14 gal. fuel tanks. In high altitude form, the aircraft attained a maximum speed of 416 mph at 44,000 ft. Thus configured the Mk VII was powered by a 1250 hp Merlin 71, medium altitude fighters having either the 1565 hp Merlin 61 or 1710 hp Merlin 64.

Spitfire PR Mk X

As the photographic reconnaissance equivalent of the Mk VII fighter, the PR X was generally similar, although the wing carried two leading edge tanks of 66.5 gal. each instead of armament. Only 16 aircraft were built and issued to two RAF PR units in May 1944 - after service introduction of the Mk XI. As maintenance of such a limited production variant proved to be difficult and the pressure cabin gave visibility problems, the type was withdrawn in September 1945.

An unidentified very early Spitfire Mk VII, showing the features of this version. Note the extended wing tips, symmetrical underwing radiators, bulge under the Coffman starter and just behind it, the long intake for the cabin air compressor. Later Mk VIIs were fitted with the broader pointed rudder. (Vickers)

Significantly different in external appearance from other Merlin marks, the Spitfire Mk VII had a double-glazed sliding canopy (compared to a fixed canopy on the Mk VI, which it resembled from a distance) and matched radiator air scoops under the wings which gave a symmetrical appearance when seen head-on. This example, in the MD100 - 146 production batch, belonged to No. 131 Sqdn in the autumn of 1944. The Mk VII was the last Spitfire variant to be used in Europe by No. 131, which left for India in November. (Via B. Robertson)

Spitfire Mk VIII

Designed before the Mk IX, but following it into service because its radical design changes would have meant production delays when time was of the essence, the Spitfire Mk VIII was an unpressurized Mk VII. Powered by the Merlin 61, 63 or 63A in standard fighter form, Merlin 66 in LF form and Merlin 70 for high altitude work, it incorporated the Vokes Aero-Vee filter in a streamlined under-nose fairing. All Mk VIIIs were built for overseas use and, fitted with the 'c' wing developed for the Mk VII, were stressed to carry up to 1000 lb. of bombs on wing and center section racks. Early machines had the pointed wingtips of the Mk VII, although standard wingtips were subsequently fitted.

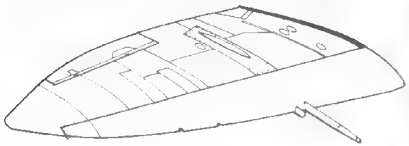
The Mk VIII saw widespread use in the Mediterranean and Far Eastern theatres, the USAAF and RAAF as well as the RAF accepting large numbers. Post war, a single Mk VIII became the prototype Spitfire Trainer with the existing cockpit moved forward 13.5 in. to make room for a second cockpit set higher and enclosed by a bubble canopy. Full instrumentation was provided in both positions and altered CG compensated for by revising the fuel system. Production trainers were Mk IX airframes.

JF275 shows the appearance of early Mk VIII fighters. The major difference from the Mk VII was the lack of a pressurized cockpit. Like the Mk VII, later Mk VIIIs had the pointed broad rudder, but retained 'c' wing armament. (Vickers)

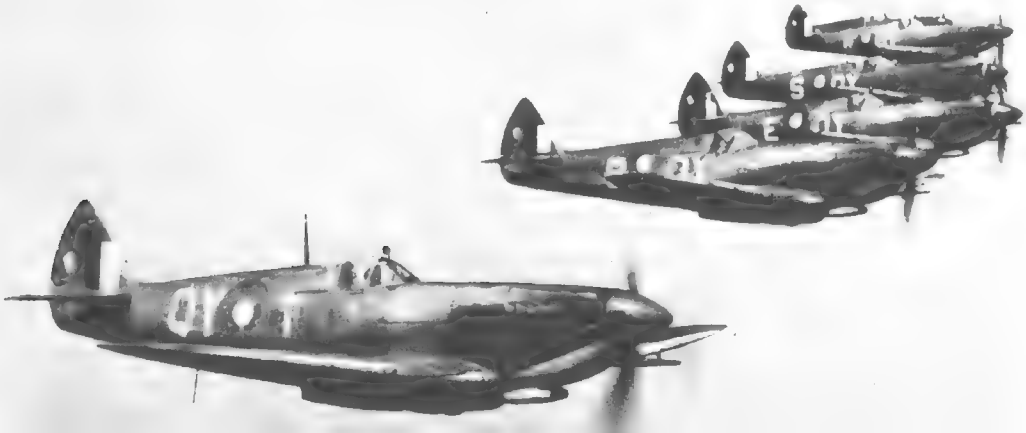
A Spitfire HF VIII with extended wingtips runs up at a 308th FS dispersal, probably at San Severo, Italy, spring 1944. (Via C. F. Shores)

Mk VIII A58-300 of No. 54 Sqdn, dispersed at Darwin, Northern Territory in 1944, takes on fuel. Painting the individual aircraft letter in white was a common practice with this unit. (F.F. Smith)

Mk VIII 'c' Wing (extended)

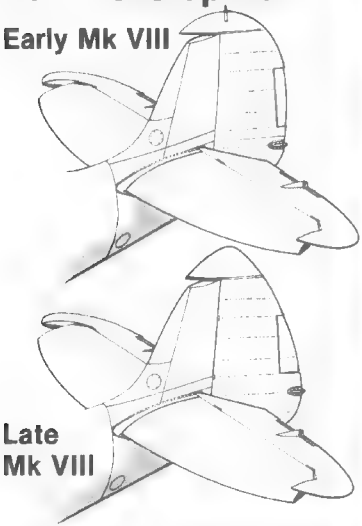


No. 452 Squadron RAAF seen flying its Mk VIIIs from Morotai, Netherlands East Indies, 30 December 1944. All aircraft carry the distinctive 'Ace of Spades' marking of No. 80 Fighter Wing on their rudders, although only the nearest machine, A58-516, that flown by the flight commander, has its codes aft of the roundel. (F.F. Smith)



Arriving in India in May 1942, No. 607 (County of Durham) Sqdn was one of the first RAF fighter units in the Far East to get Spitfires when Mk Vs were received that September. Mk VIIIs came along in March 1944 and it was with these that No. 607 finished the war - and its operational life, being disbanded at Mingaladon on 19 August 1945. This photograph shows Air Vice-Marshal C. A. Bouchier CB, CBE, DFC, paying the squadron a surprise visit for a short farewell speech that day. Greeting him is Fl. Lt. D. E. Nicholson, who carried out this auxiliary squadron's last sortie of the war. (Via B. Robertson)

Tail Development



One of the classic Spitfire photographs of the war shows A58-672, the Mk VIII flown by Wing Commander Glen Cooper of 457 Sqdn RAAF, banking off the coast of Morotai in 1945. Decorated with appropriate sharkmouths, the 'Grey Nurse' Squadron's Spitfires were unmistakable. (F.F. Smith)

Spitfire Mk IX

With the appearance of the Fw 190 on the Channel coast late in 1941, Fighter Command faced a serious dilemma. The new German fighter was clearly superior to the Spitfire Mk V on nearly every count (a fact soberingly verified in June 1942 when an Fw 190A-3 was flown into RAF Pembey in Wales and thoroughly tested). Thus the need for an improved Spitfire became paramount. It was felt however, that introduction of a radically-changed variant would take too long and disrupt production and operations at a difficult time. Fortunately an expedient solution was on hand in the form of an interim version, basically a more powerful Mk V which could be ready for squadron service with the minimum delay. This was the Mk IX, a superb fighting machine not only able to match the Fw 190 but considered by many to be the finest Spitfire of all.

Installation of the Merlin 61 engine of 1565 hp in the basic Mk Vb airframe was undertaken by Supermarine at Castle Bromwich as supplies became available. The first F Mk IXs were in operational service by July 1942. Armament of the Mk IX was initially that of the 'b' and 'c' type wings, pending the new 'e' or 'Universal' wing with 4 x 20mm Hispano cannon or two cannon and two 0.5 in. Browning machine guns, which was fitted to later series aircraft.

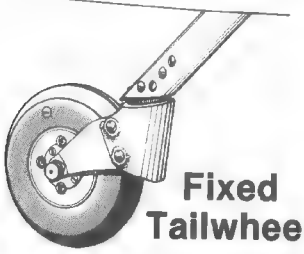
The 'e' wing was distinguishable from the 'c' wing by the cannon position, each weapon being mounted in the outer bay when only two were fitted, as the wing had shown a tendency to fail when bomb racks were also fitted. Buckling occurred on a number of occasions at the point where the rack was attached to the underside of the cannon bay in use.

Early production Mk IXs retained the rounded fin and rudder tip of the Mk V although later machines had a broad-chord pointed-tipped rudder. This feature, together with a clear view 'bubble' canopy made late Mk IXs identical to the Mk XVI. Operational Mk IXs were the first to carry the distinctive 50 gal. cylindrical drop tank on the fuselage rack, and a larger forward fuel tank with 95 gal. in the nose, two 18 gal. fabric fuel cells in the wings and a 72 gal. fuselage tank behind the pilot's seat gave a total capacity of 253 gallons.

Production of the Mk IX was second only to that of the Mk V, reaching 5,665. No. 64 Squadron was the first RAF unit to receive it and by D-Day there were 34 squadrons to support the invasion, plus 22 in England as part of Air Defence Great Britain (ADGB), as Fighter Command had been known since 15 November 1943. As well as fighter duties, Mk IXs carried out a considerable number of ground attack sorties during the invasion period, armed with a maximum 1000 lbs. of bombs on wing and fuselage racks.

Three main sub variants of the Mk IX saw service: F Mk IX (1565 hp Merlin 61 or 1650 hp Merlin 63); LF Mk IX (1580 hp Merlin 66) and HF Mk IX (1475 hp Merlin 70).

As noted, Mk IX production provided the 20 Spitfire Trainer conversions, all of which were sold to overseas governments post war. Internal changes were made to fuel capacity, there being no leading edge tanks and the original fixed tailwheel was replaced by a retractable unit. Large numbers of Mk IX fighters went overseas both during and after the war, the cost of a single example at 1943 prices being £45,000, or approximately $180,000.



Fixed Tailwheel

In November 1944, this base in southern Italy held a variety of Allied aircraft, including representative machines from at least five Spitfire squadrons: second from left is Mk Vc LZ836/SW-D of No. 253 Sqdn; another Mk Vc of this unit stands next to a Mk IX of No. 73 Sqdn with a distinctive blue and yellow fuselage flash and no spinner in the center of the photograph. Also apparent is a Mk IX (LK-W) and two Mk Vcs from No. 87 Sqdn, a Mk VIII (AN-B) of No. 417 Sqdn and a Vc from No. 249 Sqdn, probably JL346/GL-F. At the extreme left is a Mk V in the EP65- serial range fitted with a Merlin engine and painted in the markings of the Italian Co-Belligerent Air Force with unusual white wing bands. (IWM)

Virtually the whole of No. 485 Squadron was at Bovingdon when this photograph was taken on 30 March 1944, the unit having recently re-equipped with the Mk IXb. That month the squadron flew an armament practice camp, probably from Bovingdon, which was then non-operational and functioning as a B-17 Combat Crew Replacement Center, AAF Station 112. Identifiable Spitfires here include MK347/P; MK249/J; MK293/A; MK202/S and MK246/M, all with the original rounded vertical tail surfaces, while a solitary aircraft has the later pointed rudder. (USAF)

A Spitfire IX in the RK serial block being moved to a final assembly point at the Castle Bromwich plant. The 82 gal. fuel tank has yet to be installed in the bay forward of the windshield and much of the cockpit equipment, including the seat, would still be missing at this stage. Points of interest include the integral aft section of the wing root fillet and the way the electrical fitting is 'built out' to the curve of the root fairing. (Vickers)

Absorbing almost the entire complement of No. 167 Sqdn personnel, No. 322 Sqdn formed at Hornchurch on 12 June 1943 as an all-Dutch fighter unit. Moving to native soil on 31 December 1944, it flew initially from Woensdrecht, where this photograph was probably taken. It shows Mk IXs with the unit's newly applied code letters '3W', aircraft 'K', 'D', and 'F' being visible. (L.L. Peeters)

During operations to liberate Italy, No. 92 squadron made a practice of using numbers instead of letters to identify individual aircraft. This Mk IX, EN446, was QJ-1 at Grottaglie at the start of the campaign in September 1943. (F.F. Smith)

(Below Right) Probably ■ Bazenville, France, with the invasion of Europe barely a week old, this photograph shows hectic activity to repair a Mk IX of No. 403 (Canadian) Sqdn. Men ■ an RAF advance salvage team support the wing while the cannon barrel provides a leverage point to help it off. Fracturing of the propeller blades indicates Jablo wood composite construction. (IWM)

This Mk IXc, 'DU-L' of No. 312 (Czech) Sqdn, is the subject of our cover painting. These full top and bottom D-Day invasion stripes were very conspicuous, and were removed from the upper surfaces fairly quickly. (Dusan Mikolas)

Spitfire Mk I, L1088/PR-E, No. 609 Sqdn., 1939.

National Emblems

Czech Polish Norwegian French Dutch Belgian

Spitfire Mk Vb, AA853/C-WX, Wing Commander Stefan Witozenc, CO 2nd Polish Fighter Wing, Dieppe, July 1942.

Spitfire Mk Vc, BR195/AN-T, No. 417 Sqdn., 1942.

Spitfire Mk Vc, NH605/WD-D, 4th FS, 52nd FG, USAAF, 1943.

Spitfire Mk IX, MA425/RZ-R, No. 241 Sqdn., 1944.

Spitfire Mk XII, MB858/EB·D, No. 41 Sqdn., 1943

Spitfire PR XIX, RM645/I, No. 682 Sqdn., 1944

Command Pennants

Spitfire Mk XIV, RN135/YB·A, No. 17 Sqdn., 1945.

No.17 Sqdn.

Seafire Mk17, SX288/III/CH, RNAS Culham, No. 1832 Sqdn., 1946.

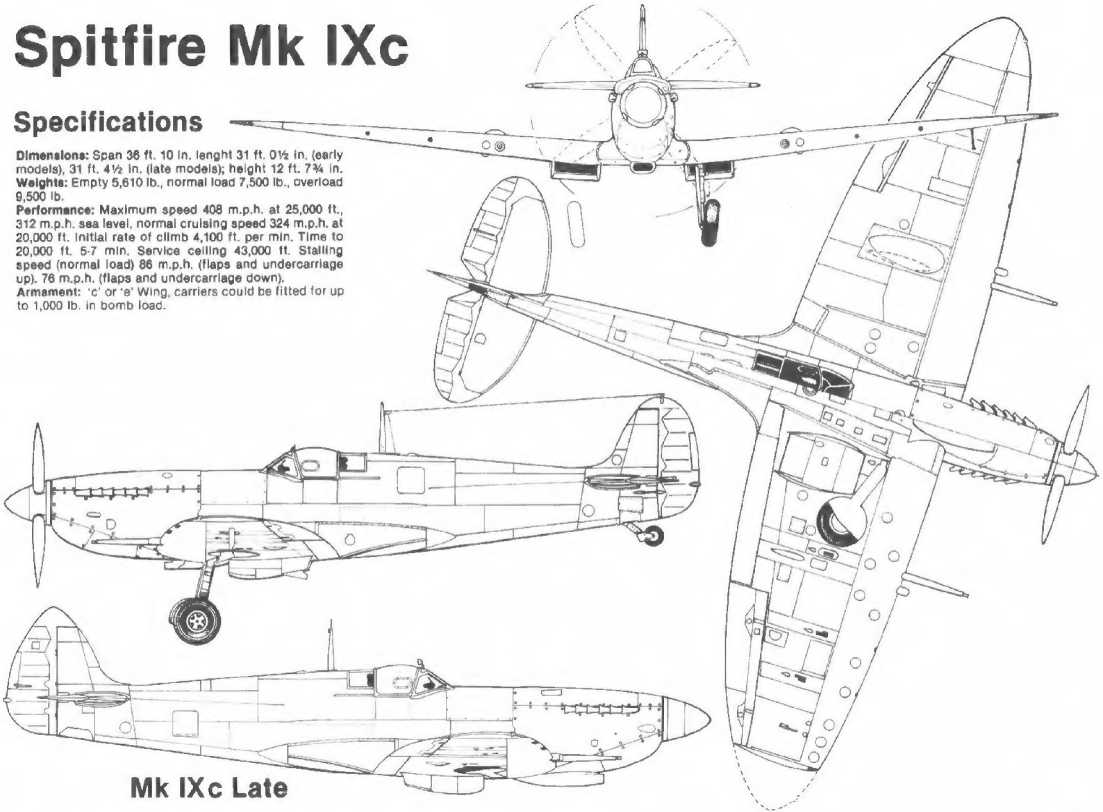
No.80 Sqdn.

Spitfire Mk 24, VN307/W2·T, No. 80 Sqdn., 1950.

Spitfire Mk IXc

Specifications

Dimensions: Span 36 ft. 10 in. lenght 31 ft. 0½ in. (early models), 31 ft. 4½ in. (late models); height 12 ft. 7¾ in.
Weights: Empty 5,610 lb., normal load 7,500 lb., overload 9,500 lb.
Performance: Maximum speed 408 m.p.h. at 25,000 ft., 312 m.p.h. sea level, normal cruising speed 324 m.p.h. at 20,000 ft. Initial rate of climb 4,100 ft. per min. Time to 20,000 ft. 5-7 min. Service ceiling 43,000 ft. Stalling speed (normal load) 86 m.p.h. (flaps and undercarriage up). 76 m.p.h. (flaps and undercarriage down).
Armament: 'c' or 'e' Wing, carriers could be fitted for up to 1,000 lb. in bomb load.



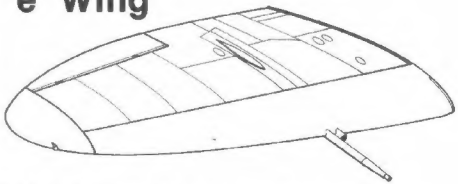
Mk IXc Late

Most theatres of war saw wing leaders' aircraft coded with their initials rather than the regular squadron codes, this one being the Mk IX flown by Wg. Cmdr. B. Heath in Italy. It carries a rank pennant below the windshield and is fitted with a cylindrical long range fuel tank. (Via B. Robertson)

(Above Left) Winter '44-45, and No. 317 Sqdn of the Polish AF is on standby for another ground attack sortie from a Dutch airfield, probably Grimbergen. Amid cold but clear conditions, ground crews make final preparations to a pair of Mk IXs, bombed up and ready to go. (Gen. Sikorsky Historical Institute)

Ammunition boxes stand on the wings of No.341 (Alsace) Sqdn Mk IXs, ready for action during the post-D-Day period. The Free French unit moved to France from Tangmere as part of No. 145 Wing, 2nd Tactical Air Force, in August '44, being based initially at Sommervieu. Nearest the camera is PL141. (ECPA)

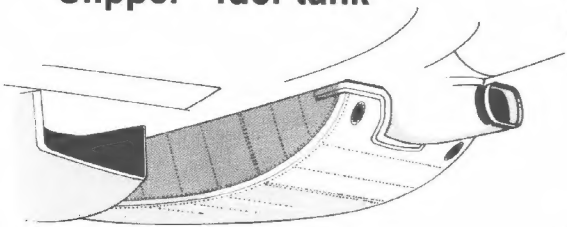
'e' Wing



Serialled in the PT range, this Mk IX is shown on the strength of No. 340 Squadron, French Air Force, complete with 'reversed' colour roundels and rudder stripes. The 'Cross of Lorraine' marking was widely used on No. 340's wartime Spitfires, which the unit flew from December 1941 until the end of the war. (ECPA)

Mk IXe RK889 is virtually identical to the Mk VIII in appearance, the major differences being the 'e' wing with normal span ailerons and the fixed tailwheel. This plane has the integral Vokes filter in the air intake. (Vickers)

"Slipper" fuel tank



F/O A.F. Lane piloted this Mk IX MH444 of No. 111 Sqdn, seen at Lago, Italy, in March '44. (F.F. Smith)

They say that if it looks right...and in this view, Spitfire Mk IX MK126 of No. 126 Squadron certainly looks just that - every inch a thoroughbred. The place is Harrowbeer in Devon, the time, summer 1944. (Via Aeroplane)